CLAIMS

WHAT IS CLAIMED IS:

1. An apparatus for use in parallel reaction of materials, comprising:

a base having a plurality of reaction wells formed therein, each of said reaction wells having a closed lower end and an open upper end for receiving components for the reaction;

a cover configured for sealing engagement with the base to form a housing enclosing said plurality of reaction wells and defining a common pressure chamber in communication with said plurality of reaction wells; and

an inlet port in communication with said pressure chamber for supplying pressurized fluid to said chamber to pressurize said plurality of reaction wells;

wherein the housing is configured to sustain a pressure substantially above atmospheric pressure.

2. The apparatus of claim 1 wherein the housing is configured to sustain an operating pressure above 10 psig.

3. The apparatus of claim 2 wherein the housing is configured to sustain an operating pressure equal to or greater than 300 psig.

4. The apparatus of claim 2 wherein the housing is configured to sustain an operating pressure equal to or greater than 1000 psig.

5. The apparatus of claim 1 wherein the base and cover are formed from titanium.

6. The apparatus of claim 1 wherein the base and cover are formed from aluminum.

7. The apparatus of claim 1 wherein the base and cover are formed from stainless steel.

8. The apparatus of claim 1 further comprising a quick release fitting coupled to the inlet port for connecting the inlet port to a pressure source.

9. The apparatus of claim 1 further comprising a pressure relief valve coupled to an outlet port in communication with said common pressure chamber.

10. The apparatus of claim 1 wherein the cover is removably attached to the base member. antecedent basis

11. The apparatus of claim 1 wherein external dimensions of the base member and cover generally correspond to standard microtiter plate dimensions for use with automation equipment designed for use with microtiter plates.

12. The apparatus of claim 11 wherein said plurality of reaction wells comprises 96 reaction wells arranged in an 8 by 12 array.

13. The apparatus of claim 12 wherein the reaction wells each have an internal volume of approximately 2 milliliters.

14. The apparatus of claim 1 wherein said plurality of reaction wells comprises 12 reaction wells arranged in a 3 by 4 array.

15. The apparatus of claim 14 wherein each of said reaction wells has an internal volume of approximately 16 milliliters.

16. The apparatus of claim 1 wherein said plurality of reaction wells are spaced approximately 9 mm apart center to center.

17. The apparatus of claim 1 further comprising a flow restriction device positioned adjacent to said open ends of the reaction wells to provide communication between the reaction wells and said pressure chamber while reducing cross-talk between the reaction wells.

18. The apparatus of claim 17 wherein the flow restriction device comprises a plurality of vent holes formed therein and aligned with said plurality of reaction wells.

19. The apparatus of claim 17 wherein the flow restriction device comprises a plurality of micromachined flow restrictions formed therein and aligned with said plurality of reaction wells.

20. The apparatus of claim 17 wherein the flow restriction device comprises a plurality of check valves aligned with the reaction wells and configured to allow flow into the reaction wells and restrict flow from the reaction wells into said chamber.

21. The apparatus of claim 17 wherein the flow restriction device comprises a rigid member.

22. The apparatus of claim 17 wherein the flow restriction device comprises an elastomeric sheet.

23. The apparatus of claim 17 wherein the flow restriction device comprises a porous sheet.

24. The apparatus of claim 17 wherein the flow restriction device is removably attached to the base member with fastening means.

25. The apparatus of claim 17 further comprising a plurality of vials inserted into said plurality of reaction wells for receiving reaction components.

26. The apparatus of claim 25 further comprising a plurality of springs disposed at the bottom of the reaction wells for biasing the vials upward against the flow restriction device.

27. The apparatus of claim 1 wherein a circumferential groove is formed in one of the base and cover and a gasket is disposed within said groove to provide a seal between the base and the cover.

28. The apparatus of claim 1 wherein the base and cover each have a periphery flange extending therefrom and configured for mating with the other of the base and cover.

29. The apparatus of claim 1 further comprising a plurality of vials inserted into said plurality of reaction wells for receiving reaction components.

30. The apparatus of claim 1 wherein said pressure chamber has a volume of approximately ten cubic inches.

31. An apparatus for use in parallel synthesis or screening of materials, comprising:

a pressure chamber sized for receiving a microtiter plate comprising a plurality of reaction wells for receiving components of the synthesis or screening, each of the reaction wells having a closed lower end and an open upper end exposed to said pressure chamber;

a cover movable between an open position for receiving the microtiter plate and a closed position;

an inlet port in communication with said pressure chamber for supplying fluid pressurized substantially above atmospheric pressure to said pressure chamber to simultaneously pressurize each of the reaction wells from an external pressure source; and

a quick-operating fastening device operable to position the cover in its closed position and hold the cover in sealing engagement with the pressure chamber.

32. The apparatus of claim 31 wherein said quick-operating fastening device is a four bar mechanism.

33. The apparatus of claim 31 further comprising a flow restriction device positioned adjacent to said open ends of the reaction wells to provide communication between the reaction wells and said pressure chamber while reducing cross-talk between the reaction wells.

34. The apparatus of claim 33 wherein the flow restriction device comprises a plurality of vent holes formed therein and aligned with said plurality of reaction wells.

35. The apparatus of claim 33 wherein the flow restriction device comprises a plurality of micromachined flow restrictions formed therein and aligned with said plurality of reaction wells.

36. The apparatus of claim 33 wherein the flow restriction device comprises a plurality of check valves aligned with the reaction wells and configured to allow flow into the reaction wells and restrict flow from the reaction wells into said chamber.

37. The apparatus of claim 31 further comprising a plurality of vials inserted into said plurality of reaction wells for receiving the synthesis or screening materials.

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38. A method for reacting a plurality of materials in parallel within a reactor vessel having a plurality of reaction wells formed therein each having an open end exposed to a common pressure chamber defined by the reactor vessel, the method comprising:

opening a cover of the reactor vessel;

inserting components into the reaction wells;

closing the cover of the reactor vessel to create a sealed chamber;

supplying a gas substantially above atmospheric pressure that reacts with the components within the reaction wells; and

releasing pressure from the reactor vessel.

39. The method of claim 38 wherein supplying a pressurized gas comprises supplying a gas at above 10 psig.

40. The method of claim 38 wherein supplying a pressurized gas comprises supplying a gas at below 1000 psig.

41. The method of claim 38 further comprising covering a portion of the open ends of the reaction wells to reduce vapor phase cross-talk between the reaction wells.

42. An apparatus for use in parallel reaction of materials, comprising:

a base having a plurality of reaction wells, each of said reaction wells having a closed lower end and an open upper end for receiving components for the reaction;

a cover configured for sealing engagement with the base to form a housing enclosing said plurality of reaction wells and defining a common pressure chamber in communication with said plurality of reaction wells;

a flow restriction device positioned adjacent to said open ends of the reaction wells to provide communication between the reaction wells and said pressure chamber while reducing cross-talk between the reaction wells; and

an inlet port in communication with said pressure chamber for supplying pressurized fluid to said chamber to pressurize said plurality of reaction wells.

43. The apparatus of claim 42 wherein the flow restriction device comprises a rigid member.

44. The apparatus of claim 42 wherein the flow restriction device comprises an elastomeric sheet.

45. The apparatus of claim 42 wherein the flow restriction device comprises a porous sheet.

46. The apparatus of claim 42 wherein the flow restriction device comprises a plurality of vent holes formed therein and aligned with said plurality of reaction wells.

47. The apparatus of claim 42 wherein the flow restriction device comprises a plurality of micromachined flow restrictions formed therein and aligned with said plurality of reaction wells.

48. The apparatus of claim 42 wherein the flow restriction device comprises a plurality of check valves aligned with the reaction wells and configured to allow flow into the reaction wells and restrict flow from the reaction wells into said chamber.

49. The apparatus of claim 42 further comprising a plurality of vials inserted into said plurality of reaction wells for receiving reaction components.

50. The apparatus of claim 49 further comprising a plurality of springs disposed at the bottom of the reaction wells for biasing the vials upward against the flow restriction device.

51. The apparatus of claim 42 wherein said pressurized fluid is pressurized substantially above atmospheric pressure.